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(54) **Lock, in particular for a vehicle tail hatch, with transverse immobilisation and automatic take-up of slack.**

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Description

This invention relates to a vehicle lock of the type according to the preamble of claim 1.

Locks of the aforesaid type are mostly used on vehicles, and in particular for fastening the vehicle tail hatch or boot lid to the body when in the closed position. In known locks of the aforesaid type the tail hatch cannot be correctly immobilised in the transverse direction because the mounting tolerances can produce a transverse difference between the position of the lock plate and the position of the striker unit which can be as much as a several millimetres, either because of incorrect centering of the hatch within the opening which houses it on the vehicle body, or because of errors in assembling the lock plate or striker unit. In order to compensate these transverse differences, the engagement between the fork and striker pin has to be made with rather large lateral clearances. This lack of transverse immobilisation of the hatch results in annoying vibration during running, and overloading of the lock structure, which can cause jamming, malfunction and rapid wear.

The object of the invention is to provide a lock of the said type which has a structure such as to prohibit any transverse movement of the lock plate relative to the striker unit, even if the transverse difference in their positions is relatively large. Said object is attained according to the invention by a vehicle lock, particularly for a tail hatch thereof, of the type comprising a striker unit comprising a first bracket and a striker pin carried rigidly by said bracket, and a lock plate rigidly lockable to said striker unit and comprising a second bracket and a transverse element of substantially isosceles trapezium plan shape rigid with the central part of said second bracket and projecting therefrom, said trapezoidal element carrying a rotatable fork arranged to engage said pin and supporting a locking mechanism for locking said fork in a position of engagement with said pin when said lock plate cooperates with said striker unit, said trapezoidal element being arranged to be inserted into said first bracket so that a longitudinal slot provided in it in the direction of its insertion into said first bracket engages said pin with lateral clearance, characterised in that said striker unit is provided laterally with a pair of opposing wedge-shaped blocks carried longitudinally slidable in the direction of insertion of the trapezoidal element into said first bracket and perpendicular to said striker pin against the action of elastic means, said trapezoidal projecting element of the lock plate being provided with respective oblique longitudinal side edges which converge in the direction of insertion of said trapezoidal element into said first bracket and are arranged to cooperate with said wedge-shaped

blocks to laterally immobilise said lock plate relative to said striker unit.

The invention will be more apparent from the non-limiting description of one embodiment thereof given hereinafter with reference to the accompanying drawings in which:

Figure 1 is an elevational view of a lock constructed in accordance with the invention with its two main components disengaged but disposed in their operating position;

Figure 2 is a sectional elevational view of the lock of Figure 1 to an enlarged scale with its component elements engaged; and

Figure 3 is a sectional on the line III-III of the lock of Figure 2.

In Figure 1 the reference numeral 1 indicates overall a lock for a known vehicle of any type and therefore not shown for simplicity, and in particular for a tail hatch or lid closing a motor vehicle luggage compartment, of the type comprising a first support element or lock plate 2 carrying a rotatable fork 3 and arranged to carry a locking mechanism for the fork 3 which is of known type and therefore not shown for simplicity, and a second support or striker unit 4 rigidly carrying a striker pin 5, which the fork 3 is arranged to engage in order to close the lock 1 when the lock plate 2 is made to approach the striker unit 4 with translational motion until the two elements are brought into cooperation by insertion one into the other. The lock plate is normally mounted rigid with said hatch or lid of said vehicle, not shown, whereas the striker unit 4 is mounted rigid with the body of said vehicle, not shown, in correspondence with the rim of the luggage compartment on which said hatch or lid abuts when in the closed position. In all cases the lock plate 2 and striker unit 4 are mounted for use exactly in the position illustrated in Figure 1, so that they are brought into contact by the vertical closure movement of the hatch or lid in order to be rigidly fastened together by the engagement of the fork 3 on the pin 5, as illustrated in Figure 2, which shows the lock 1 in its closed position.

With reference also to Figures 2 and 3 the lock plate 2 comprises a substantially flat bracket 8 for fixing to said hatch or lid of the known vehicle, not shown, and a central transverse element 9 projecting laterally from the central part of the bracket 8 and having the shape substantially of an isosceles trapezium in plan, in a plane perpendicular to the axis of the pin 5. The element 9 carries the fork 3 rotatable about a pin 11 and is arranged to carry said known fork locking mechanism, not shown for simplicity, said mechanism, of which the lock control known of known type, not shown for simplicity, also forms part, being arranged to cooperate with the fork 3 in order to lock it, when the lock plate 2

cooperates with the striker unit 4, in the position shown in Figure 2 in which it is engaged with the pin 5. Preferably, the projecting element 9 and the bracket 8 are formed integrally in one piece by bending and semi-blanking a metal plate, for example of steel. The trapezoidal element 9 is longitudinally delimited by respective oblique bent lateral edges 10 which converge towards that end 12 of the element 9 facing the striker unit 4, and is provided along its longitudinal axis with a slot 14 open towards the end 12 and shaped so as to engage the pin 5 with considerable axial clearance in correspondence with the fork 3, which projects across it, on engagement between the lock plate 2 and striker unit 4. This latter comprises a substantially U-shaped metal bracket 16 terminating with respective connection lugs 18 which project laterally, the pin 5, which is rigidly fixed to the centre line of the bracket 16 for example by clinching in a hole 19 passing through it (Figure 3), and a sleeve 20 of substantially rectangular cross-section which is constructed of a synthetic plastics material and is inserted rigidly into the bracket 16, in which it is retained so that part of it projects axially towards the lock plate in a manner perpendicular to the lugs 18 by the pin 5, for example by again clinching this latter in a hole 21 passing through a side wall of the sleeve 20. The trapezoidal element 9 is arranged to be inserted in the direction of its longitudinal axis starting from its end 12 into the bracket 16, and specifically into the sleeve 20, during the movement of the lock plate 2 towards the striker unit 4, so that its slot 14 engages the pin 5 with transverse clearance such that this latter rests against the front edge 22 of the fork 3 to consequently rotate this latter from its disengaged position of Figure 1 into its engaged position of Figure 2. According to the invention the rotatable fork 3 is arranged to engage the striker pin 5 so as to immobilise the lock plate 2 against the striker unit 4 only in the longitudinal direction in which the trapezoidal element 9 is inserted into the bracket 16, the lateral immobilisation of the lock plate 2 against the striker unit 4 being effected by respective wedge-shaped blocks 26 provided laterally on the striker unit 4 and carried by the bracket 16 in a manner longitudinally slidable perpendicular to the striker pin 5 in the direction of insertion of the trapezoidal element 9 into the bracket 16 against the action of elastic means 27, and are arranged to cooperate by means of their oblique edges 10 to laterally immobilise the lock plate 2 relative to the striker unit 4 and simultaneously to compensate any lateral misalignment of the lock plate 2 with respect to the striker unit 4 by retracting to a different extent against the action of the elastic means 27 by the effect of their cooperation with the oblique edges 10 of the trapezoidal element 9,

on insertion of this latter into the bracket 16.

The slidable wedge-shaped blocks 26 are preferably constructed of a synthetic plastics material and are slidably inserted into respective opposing longitudinal guides 28 carried rigidly by the bracket 16 on the opposite sides of the pin 5 and are disposed perpendicular to this latter, they being provided with travel limiting means to prevent their expulsion from the guides 28 by the effect of the thrust of the elastic means 27, which consist preferably of respective helical springs housed in the guides 28 and each cooperating with a respective block 26. Specifically, the guides 28 are formed longitudinally within the plastics sleeve 20 with a substantially T-shaped cross-section and are closed at that end distant from the end 12, i.e. at the opposite end to that from which the element 9 is inserted into the bracket 16, by the perimetral base wall 29 of the sleeve 20, against which the springs 27 rest, these being inserted, each in a preloaded state, between a respective block 26 and the base wall 29 so as to cooperate with the blocks 26 to cause these latter when at rest to partly emerge from the bracket 16, to assume an end-of-travel position defined by respective transverse screws 30 which are carried by a portion 31 of the sleeve 20 projecting beyond the bracket 16 and abuttingly cooperate with respective longitudinal grooves 32 in the blocks 26. These latter each comprise a T-shaped side portion 33 slidably inserted into the relative guide 28 and provided with the groove 32, and a main portion bounded on the side distant from the side portion 33 by a pair of adjacent oblique surfaces 34 and 35. The more inclined surfaces 34 define a lead-in which facilitates the insertion of the lock plate 2 into the striker unit 4, whereas the surfaces 35 have the same inclination as the edges 10 and are arranged to slidably cooperate with these latter as soon as engagement of the slot 14 with the pin 5 commences.

When in use, the lock 1 is mounted with the striker unit 4 and lock plate 2 disengaged and positioned as in Figure 1. During closure of the hatch or lid the lock plate 2 undergoes translational movement to approach the striker unit 4 by following a trajectory substantially parallel to the slot 14, to produce progressive insertion of the element 9 into the sleeve 20. If the lock plate 2 and striker unit 4 are correctly positioned, the edges 10 make simultaneous contact with the blocks 26 to cause these to both retract by the same distance until the edge 22 makes contact with the pin 5 to rotate the fork 3 and cause it to hook over the pin 5. In this manner the lock plate 2 is rigidly locked to the striker unit 4 both axially in the direction in which the element 9 is inserted into the bracket 16, i.e. parallel to the direction of closure of said hatch or lid, and laterally in that by virtue of the elastic

reaction of the springs 27 the blocks 26 prevent lateral movement of the element 9 even if this is only loosely engaged with the pin 5, the fork 3 being disposed in such a manner as to allow relative lateral movement of the pin 5. If however there is a transverse difference in the positions of the lock plate 2 and striker unit 4, as they approach each other only one of the blocks 26 makes contact with the element 9 and is consequently retracted to compress the relative spring 27 and compensate this transverse difference, until the other block 26 also comes into contact with the element 9. From this point onwards, the blocks 26 are retracted simultaneously until the fork 3 engages with the pin 5, this engagement not being hindered by this transverse position difference because of the rather large lateral clearance between the pin 5, the fork 3 and the relative slot 14. Thus axial immobilisation of the lock plate 2 is again obtained by virtue of the fork 3, and lateral immobilisation is also obtained by virtue of the thrust which the blocks 26 exert against the element 9.

The advantages of the present invention are apparent from the foregoing description. In this respect, a very simple and low-cost lock is obtained which has the same structure as currently used known locks, but which in contrast to these latter ensures lateral immobilisation of the lock plate and consequently of the hatch or lid rigid with it, independently of any lateral misalignment between the lock plate and striker unit. This results both in reduction of the lock wear and elimination of vibration or noise during vehicle running.

Claims

1. A vehicle lock, particularly to a tail hatch thereof, of the type comprising a striker unit (4) comprising a first bracket (16) a striker pin (5) carried rigidly by said bracket (16), and a lock plate (2) rigidly lockable to said striker unit (4) and said lock plate (2) comprising a second bracket (8) and a transverse element (9) of substantially isosceles trapezium plan shape rigid with the central part of said second bracket (8) and projecting therefrom, said trapezoidal element (9) carrying a rotatable fork (3) arranged to engage said pin (5) and to support a locking mechanism for locking said fork (3) in a position of engagement with said pin (5) when said lock plate (2) cooperates with said striker unit (4), said trapezoidal element (9) being arranged to be inserted into said first bracket (16) so that a longitudinal slot (14) provided in it in the direction of its insertion into said first bracket (16) engages said pin (5) with lateral clearance, characterised in that said striker unit (4) is provided laterally with a

pair of opposing wedge-shaped blocks (26) carried longitudinally slidable in the direction of insertion of the trapezoidal element (9) into said first bracket (16) and perpendicular to said striker pin (5) against the action of elastic means (27), said trapezoidal projecting element (9) of the lock plate being provided with respective oblique longitudinal side edges (10) which converge in the direction of insertion of said trapezoidal element (9) into said first bracket (16) and are arranged to cooperate with said wedge-shaped blocks (26) to laterally immobilise said lock plate (2) relative to said striker unit (4).

2. A vehicle lock as claimed in claim 1, characterised in that said rotatable fork (3) is arranged to engage said striker pin (5) so as to immobilise the lock plate (2) against the striker unit (4) only in the longitudinal direction, in the direction in which said trapezoidal element (9) is inserted into said first bracket (16), lateral immobilisation of said lock plate (2) against the striker unit (4) being provided by said wedge-shaped blocks (26) which are arranged to compensate any lateral misalignment between the lock plate (2) and striker unit (4) by retracting to a different extent against said elastic means (27) by the effect of their cooperation with said oblique edges (10) of the trapezoidal element (9) on inserting this latter into said first bracket (16).
3. A vehicle lock as claimed in claim 1 or 2, characterised in that said wedge-shaped blocks (26) are slidably inserted into respective opposing guides (28) carried rigidly by said first bracket (16) on opposite sides of said striker pin (5) and positioned perpendicular thereto, travel limiting means being provided rigid with said first bracket (16) to prevent expulsion of said wedge-shaped blocks (26) from said guides (28) under the thrust of said elastic means (27).
4. A vehicle lock as claimed in claim 3, characterised in that said wedge-shaped blocks (26) are of synthetic plastics construction and are slidably carried by a synthetic plastics sleeve (20) inserted rigidly into said first bracket (16), said guides (28) for the blocks (26) being formed longitudinally within said sleeve (20) and being substantially of T-shaped cross-section, a preloaded helical spring (27) being housed, interposed between each said slidable wedge-shaped block (26) and a base wall provided on said sleeve (20) perpendicular to said guides (28) at the end distant from that through

which said trapezoidal element (9) is inserted into said first bracket (16), in the corresponding said guide (28) so as to cooperate with the respective block (26) in order to urge it to project partly beyond said first bracket (16) to assume an end-of-travel position defined by respective transverse screws (30) carried by said sleeve (20) and cooperating with respective grooves (32) in said blocks (26).

5. A vehicle lock as claimed in any one of the preceding claims, characterised in that said first bracket (16) is substantially of U shape and terminates with respective laterally projecting connection lugs (18).

Revendications

1. Serrure de véhicule, notamment pour un hayon de celui-ci, du type comprenant une gâche (4) comprenant un premier support (16) et une broche de gâche (5) portée rigidement par le support (16), et un palastre (2) pouvant être verrouillé sur la gâche (4), ce palastre (2) comprenant un deuxième support (8) et un élément transversal (9) ayant en plan la forme d'un trapèze isocèle solidaire de la partie centrale du deuxième support (8) et s'en projetant, cet élément trapézoïdal (9) portant une fourche pivotante (3) agencée pour coopérer avec la broche (5) et pour supporter un mécanisme de verrouillage pour verrouiller la fourche (3) dans une position de coopération avec la broche (5) lorsque le palastre (2) coopère avec la gâche (4), cet élément trapézoïdal (9) étant agencé pour être introduit dans le premier support (16) de sorte qu'une fente longitudinale (14) ménagée dans l'élément transversal dans la direction de son introduction dans le premier support (16) coopère avec cette broche (5) avec un jeu latéral, caractérisée en ce que la gâche (4) comporte latéralement deux blocs en forme de coin en vis-à-vis (26) portés de façon à coulisser longitudinalement dans la direction de l'introduction de l'élément trapézoïdal (9) dans le premier support (16) et perpendiculairement à la broche de gâche (5) contre l'action de moyens élastiques (27), cet élément trapézoïdal saillant (9) du palastre comportant des bords latéraux longitudinaux obliques respectifs (10) qui convergent dans la direction de l'introduction de l'élément trapézoïdal (9) dans le premier support (16) et qui sont agencés pour coopérer avec les blocs en forme de coin (26) pour immobiliser latéralement le palastre (2) par rapport à la gâche (4).

2. Serrure de véhicule selon la revendication 1,

caractérisé en ce que cette fourche pivotant (3) est agencée de façon à coopérer avec la broche de gâche (5) de façon à immobiliser le palastre (2) contre la gâche (4) seulement dans la direction longitudinale, c'est-à-dire la direction dans laquelle l'élément trapézoïdal (9) est introduit dans le premier support (16), une immobilisation latérale du palastre (2) contre la gâche (4) étant procurée par ces blocs en forme de coin (26) agencés pour compenser tout défaut d'alignement latéral entre le palastre (2) et la gâche (4) par rétraction dans une certaine mesure contre l'action de moyens élastiques (27) par l'effet de leur coopération avec les bords obliques (10) de l'élément trapézoïdal (9) lors de l'introduction de ce dernier dans le premier support (16).

3. Serrure de véhicule selon la revendication 1 ou la revendication 2, caractérisée en ce que les blocs en forme de coin (26) sont introduits en coulissement dans des guides respectifs en vis-à-vis (28) portés rigidement par le premier support (16) sur des côtés opposés de la broche de gâche (5) et disposés perpendiculairement à celle-ci, des moyens de limitation de déplacement étant prévus solidaires du premier support (16) pour empêcher que les blocs en forme de coin (26) soient expulsés de leurs guides (28) sous l'action de la poussée des moyens élastiques (27).
4. Serrure de véhicule selon la revendication 3, caractérisée en ce que les blocs en forme de coin (26) sont en matière plastique synthétique et sont portés à coulissement par un manchon en matière plastique synthétique (20) introduit rigidement dans le premier support (16), les guides (28) pour les blocs (26) étant formés longitudinalement à l'intérieur du manchon (20) et ayant pratiquement la forme d'un T en coupe transversale, un ressort hélicoïdal précontraint (27) étant logé, interposé entre chaque bloc en forme de coin coulissant (26) et une paroi de base procurée sur le manchon (20) perpendiculaire aux guides (28) au niveau de l'extrémité opposée à celle à travers laquelle l'élément trapézoïdal (9) est introduit dans le premier support (16), dans le guide correspondant (28) de façon à coopérer avec le bloc respectif (26) afin de le forcer à se projeter partiellement au-delà du premier support (16) pour prendre une position de fin de déplacement définie par des vis transversales respectives (30) portées par le manchon (20) et coopérant avec des rainures respectives (32) dans les blocs (26).

5. Serrure de véhicule selon l'une quelconque des revendications précédentes, caractérisée en ce que le premier support (16) a pratiquement la forme d'un U et se termine par des pattes de fixation se projetant latéralement respectives (18).

Patentansprüche

1. Fahrzeugschloß, insbesondere für eine Heckklappentür, des Typs, der eine Anschlagseinheit (4) mit einem ersten Träger (16) und einem Anschlagstift (5), der starr durch den Träger (16) getragen wird, und eine Schloßplatte (2) aufweist, die fest mit der Anschlagseinheit (4) verschließbar ist, und die Schloßplatte (2) einen zweiten Träger (8) und ein Querelement (9) von im wesentlichen gleichschenkligen trapezförmigem Grundriß, das starr mit dem mittleren Teil des zweiten Trägers (8) ausgebildet ist und von diesem hervorragt, wobei das trapezförmige Element (9), das eine drehbare Gabel (3) trägt, vorgesehen ist, den Stift (5) anzugreifen und einen Verriegelungsmechanismus zum Verriegeln der Gabel (3) in einer Eingriffsstellung mit dem Stift (5) zu halten, wenn die Schloßplatte (2) mit der Anschlagseinheit (4) zusammenwirkt, wobei das trapezförmige Element (9) vorgesehen ist, in den ersten Träger (16) eingebracht zu werden, so daß ein Längsschlitz (14), der in diesem in der Richtung seiner Einbringung in den ersten Träger (16) vorgesehen ist, den Stift (5) mit seitlichem Abstand angreift, dadurch gekennzeichnet, daß die Anschlagseinheit (4) seitlich mit einem Paar sich gegenüberliegender keilförmiger Klötze (26) versehen ist, die längs verschiebbar in der Einbringrichtung des trapezförmigen Elementes (9) in den ersten Träger (16) und senkrecht zum Anschlagstift (5) gegen die Wirkung elastischer Mittel (27) gehalten sind, wobei das trapezförmige hervorragende Element (9) der Schloßplatte mit entsprechenden schrägen Längsseitenkanten (10) versehen ist, die in Einbringrichtung des trapezförmigen Elementes (9) in den ersten Träger (16) konvergieren, und vorgesehen sind, mit den keilförmigen Klötzen (26) zusammenzuwirken, um seitlich mit der Schloßplatte (2) in Bezug zur Anschlagseinheit (4) in Festlegung zu gelangen.
2. Fahrzeugschloß nach Anspruch 1, dadurch gekennzeichnet, daß die drehbare Gabel (3) vorgesehen ist, mit dem Anschlagstift (5) derart in Eingriff zu kommen, um die Schloßplatte (2) gegen die Anschlagseinheit (4) nur in der Längsrichtung festzulegen, das heißt in die Richtung, in der das trapezförmige Element

(9) in den ersten Träger (16) eingesetzt wird, wobei die seitliche Festlegung der Schloßplatte (2) gegen die Anschlagseinheit (4) durch die keilförmigen Klötze (16) hervorgerufen wird, die vorgesehen sind, irgendwelche seitliche Versetzung zwischen der Schloßplatte (2) und der Anschlagseinheit (4) durch Zurückziehen auf ein unterschiedliches Maß gegen die elastischen Mittel (27) durch die Wirkung ihrer Beziehung mit den schrägen Kanten (10) des trapezförmigen Elementes (9) auf das Einbringen des letzteren in den ersten Träger (16) auszugleichen.

3. Fahrzeugschloß nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die keilförmigen Klötze (26) gleitbare in entsprechende gegenüberliegende Führungen (28) eingebracht sind, die starr durch den ersten Träger (16) an gegenüberliegenden Seiten des Anschlagstiftes (5) gehalten und senkrecht dazu angeordnet sind, wobei Bewegungsbegrenzungsmittel starr mit dem ersten Träger (16) versehen sind, um Loslösen der keilförmigen Klötze (26) von den Führungen (28) unter dem Druck der elastischen Mittel (27) zu verhindern.
4. Fahrzeugschloß nach Anspruch 3, dadurch gekennzeichnet, daß die keilförmigen Klötze (26) eine synthetische Plastikkonstruktion sind und gleitbar durch eine synthetische Plastikhülse (20) gehalten werden, die starr in den ersten Träger (16) eingebracht ist, daß die Führungen (28) für die Klötze (26) längsseits innerhalb der Hülse (20) ausgebildet und im wesentlichen von T-förmigem Querschnitt sind, daß eine vorbelastete Schraubenfeder (27) eingebaut ist, die zwischen jedem der gleitbaren keilförmigen Klötze (26) und einer Basiswand eingebracht ist, die an der Hülse (20) senkrecht zu den Führungen (28) an dem Ende vorgesehen ist, das gegenüber von demjenigen ist, durch welches das trapezförmige Element (9) eingesetzt wird, korrespondierend mit den Führungen (28), um mit dem entsprechenden Klotz (26) zusammenzuwirken, damit er gedrängt wird, teilweise über den ersten Träger (16) hinauszuragen, um eine Endstellung einzunehmen, die durch entsprechende querliegende Schrauben (30) definiert ist, die von der Hülse (20) getragen werden und mit entsprechenden Nuten (32) in den Klötzen (26) zusammenwirken.

5. Fahrzeugschloß nach irgendeinem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß der erste Träger (16) von im wesentlichen U-Form ist und mit entsprechenden seit-

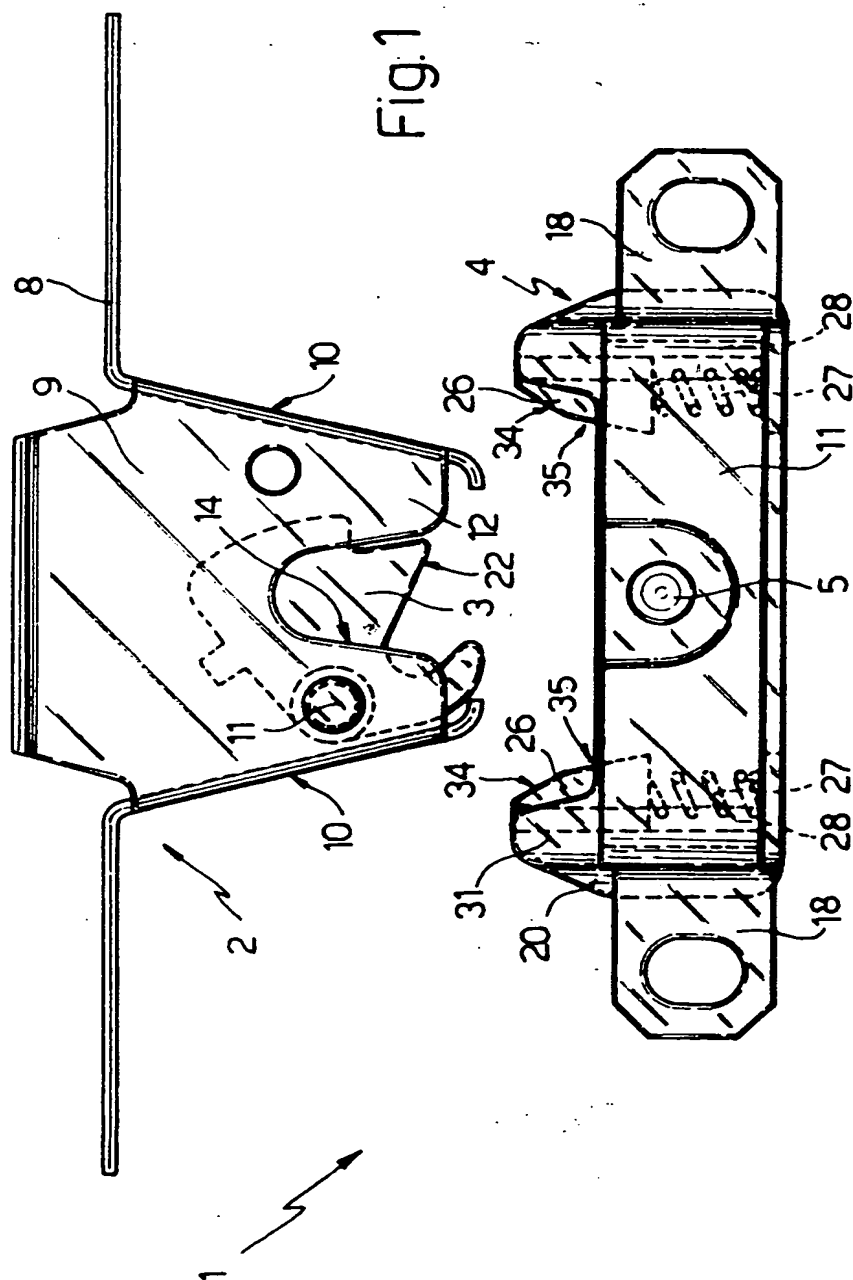


Fig. 1

lich hervorstehenden Verbindungsansätzen
(18) versehen ist.

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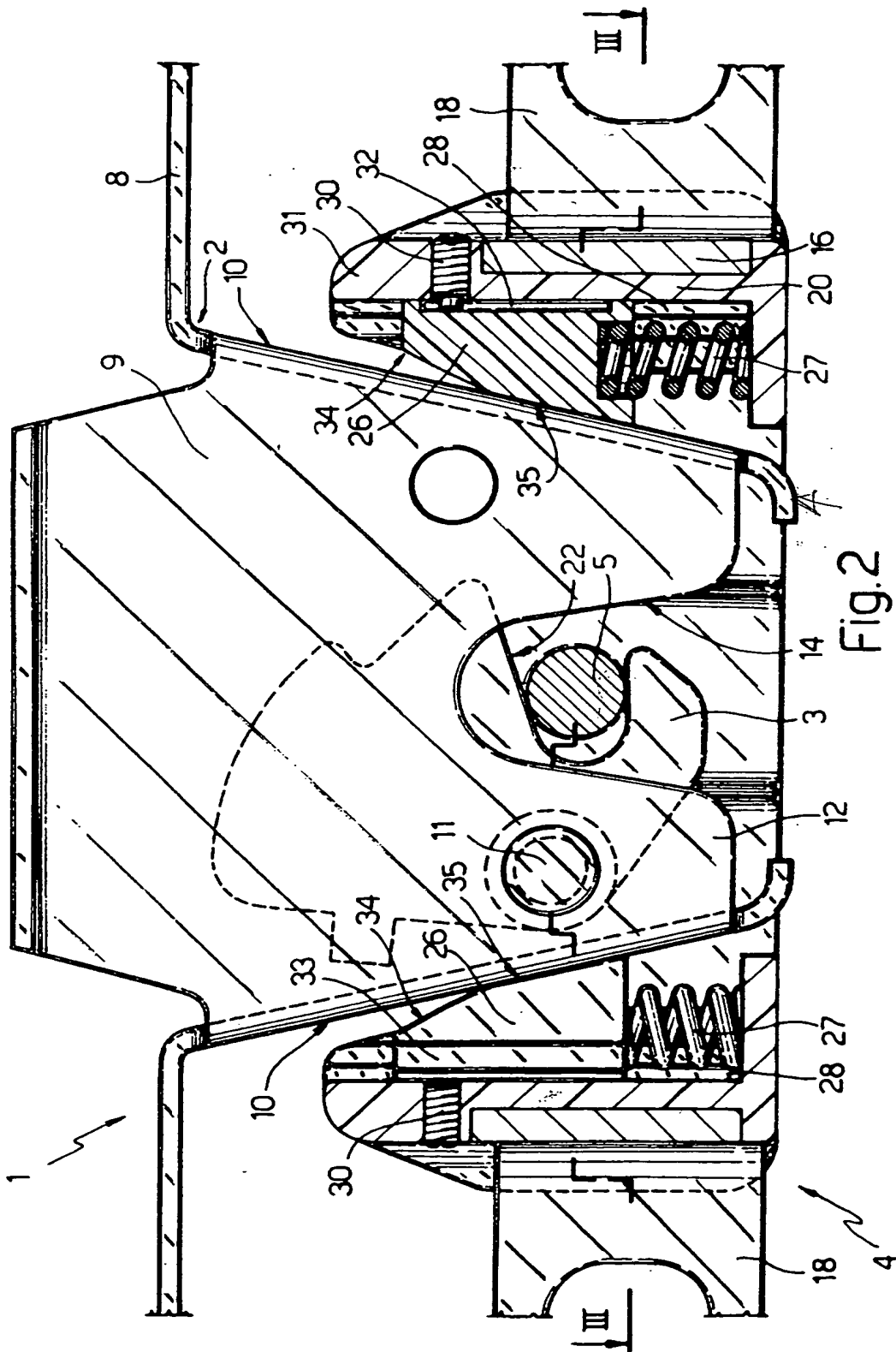
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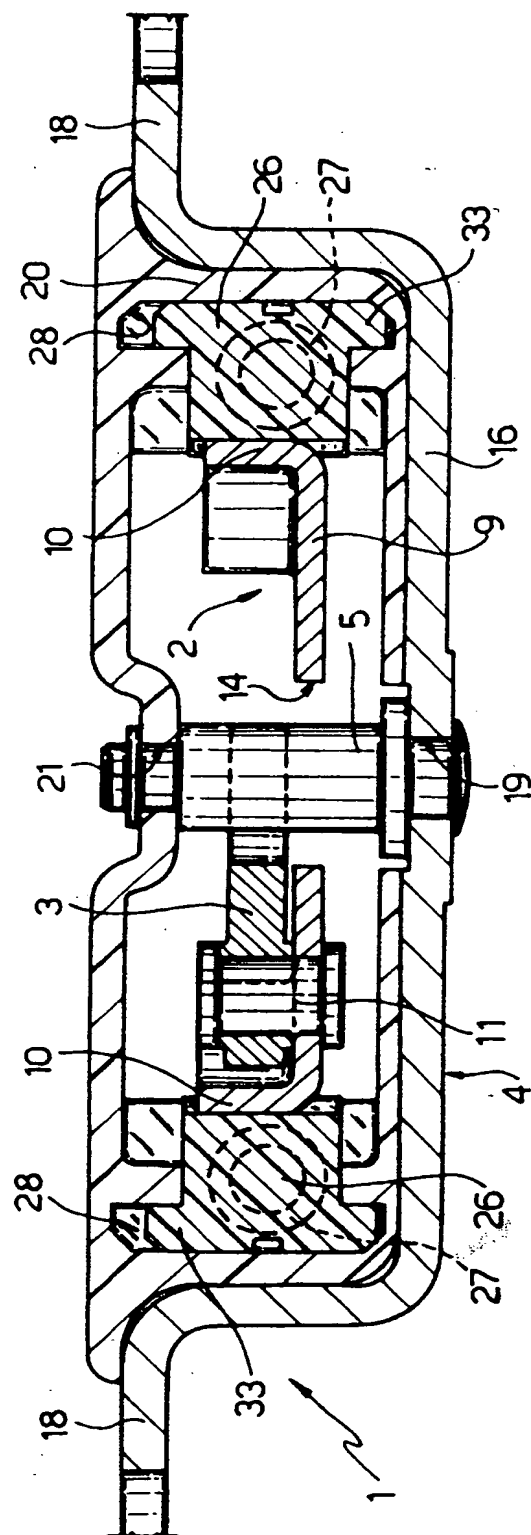


Fig. 3